

SUPPORT FOR THE AMENDMENTS

Claim 25 has been amended to remove the recitation of the crystallite size.

Accordingly, no new matter is believed to have been added to the present application by the amendments submitted above.

REMARKS

Claims 25 remains pending. Favorable reconsideration is respectfully requested.

The present invention relates to a coated glass glazing provided on at least a portion of one of its faces with a coating having photocatalytic properties, and comprising titanium oxide at least partly crystallized in anatase form, and obtained by thermal decomposition of titanium precursors selected from the group consisting of organo-metallic precursors and metallic halide precursors, where the coating has a thickness between 5 and 50 nm. See Claim 25.

According to the specification, a glazing is a substrate in which the coating retains its integrity:

For long-term effectiveness, it is obviously *important for the coating to retain its integrity*, even if it is directly exposed to numerous attacks, in particular during the fitting of the *glazing* on a building site (building) or on a production line (vehicle) which involves repeated handlings by mechanical or pneumatic means, and also once the glazing is in place, with risks of abrasion (windscreen wipers, abrasive rag) and of contact with aggressive chemicals... [Page 2, lines 26-34; emphasis added.]

Thus, Claim 25 does not embrace a substrate merely coated with “dust” of particles. Rather, the coating of the claimed glazing must be firmly attached thereto in order to retain its integrity.

The rejection under 35 U.S.C. §102(e) or §103(a) over Vandiest (U.S. patent No. 5,721,054) is respectfully traversed. Vandiest fails to disclose or suggest the claimed coated substrate.

Appellants submitted a second executed Rule 132 Declaration from Dr. Bernard Nghiêm in the present application on May 22, 2006. Dr. Nghiêm has read and is familiar with the specification and the subject matter of claims 25-30, 34-39 and 44-45 of the present application (see paragraphs 4-6 of the second Declaration).

Dr. Nghiêm has carefully reviewed the description of the coating in the specification (see paragraph 7 of the second Declaration). Based on that review, Dr. Nghiêm concludes that:

In view of the description provided by the specification of the above-identified application, one skilled in the art would have concluded that the coating of the invention described therein and specified in the claims identified above was mechanically resistant and sufficiently adherent to the substrate in order to be used as a glazing. [See paragraph 8 of the second Declaration; emphasis added]

Dr. Nghiêm acknowledges that the specification does not contain explicitly state that the coating is mechanically resistant and sufficiently adherent to the substrate in order to be used as a glazing. However, he states:

...for the reasons discussed above, one skilled in the art reading that specification would appreciate that the coating of the substrates specified in claims 25-30, 34-39 and 44-45 of the above-identified application necessarily had those properties in order to be used as a glazing in the specification. [See paragraph 9 of the second Declaration.]

Appellants submitted the first executed Rule 132 Declaration from Dr. Nghiêm on November 23, 2005. In that Declaration, Dr. Nghiêm discusses that procedure for depositing titanium oxide coatings. See the top of page 2 of the first Declaration. Dr. Nghiêm states:

After closely examining the deposition procedure described by Vandiest, I believe that, while the conditions given by Vandiest can work well with a mixture of tin tetrachloride and water, this is not the case for titanium tetrachloride and water. On the basis of experiments I performed, I can confirm that for the deposition of titania, the use of the  $\text{TiCl}_4$  and water ends up creating a nanoparticle powder and does not form a homogeneous coating on the substrate surface. [See page 2 of the first Declaration.]

Dr. Nghiêm points out that attempting to deposit titanium dioxide under the conditions described by Vandiest produces the well-known result of creating powder as had been used in fluid flows to study the hydrodynamics of the flow (see the bottom of page 2 and the top of page 3 of the first Declaration).

Beginning at the bottom of page 3 of the first Declaration, Dr. Nghiêm describes the deposition procedures as described in patents referred to by Vandiest in the specification of the patent. Dr. Nghiêm states

If such a configuration (in figure 3) is used with water and titanium tetrachloride, at the intersection region between the 2 flows from the 2 nozzles, nano powder is formed instead of a coating. [Declaration page 3, last sentence.]

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So if this kind of tool is used with  $\text{TiCl}_4$  and water instead of  $\text{SiH}_4$  and  $\text{O}_2$ , nano power is formed before arriving on the substrate surface. [Declaration page 4, last sentence.]

Beginning at page 6 of the first Declaration, Dr. Nghiêm describes experiments that were conducted in order to reproduce the conditions of the deposition and the tool for the gas injection mentioned by Vandiest and FR2648453. Dr. Nghiêm summarizes the results of the experiments at the top of page 9, stating:

With the preceding deposition parameters, we could not deposit any real coating. Instead, we have produced powder, part of which weakly adheres to the surface of the substrate when the experiment was over. This powder can be easily wiped out by a tissue cloth.

Dr. Nghiêm concludes as follows:

The process parameters described by Vandiest for the deposition of large gap semi conductor like  $\text{SnO}_2$  or  $\text{TiO}_2$ , starting from Ti or Sn tetrachloride with water as oxidant are only valid for the deposition of  $\text{SnO}_2$ . In the case of  $\text{TiO}_2$ , our own experiments and several scientific sources have proven clearly that even at low temperature  $\text{TiO}_2$  powder is formed when  $\text{TiCl}_4$  and water is brought into contact, instead of an homogeneous coating on the surface. [Declaration at the middle of page 9.]

Thus, the Declaration of Dr. Nghiêm demonstrates that the method described in Example 1 of Vandiest does not produce a photocatalytic coating of titanium dioxide on a substrate.

In fact, in Dr. Nghiêm's second Declaration he states:

For those reasons, the process parameters described by Vandiest do not provide a coating of photocatalytic titanium oxide that is mechanically resistant and sufficiently adherent to the substrate in order to be used as a glazing as specified in claims 25-30, 34-39 and 44-45 of the above-identified application. [See paragraph 11 of the second declaration.]

Appellants submitted an executed Rule 132 Declaration from Dr. L  thicia Gu  neau on December 8, 2003. Dr. Gu  neau has eight years of experience in the field of physico chemistry/self-cleaning glass (see paragraphs (1) and (2) of the Declaration).

Dr. Gu  neau points out that in Example 2, Vandiest describes a glass substrate coated with a 41 nm TiO<sub>2</sub> layer, which, in turn, is coated with a layer of Fe, Co, and Cr oxides having a thickness of 45 nm (see paragraph (6) of the Declaration). In Example 3, Vandiest describes a glass substrate coated with a 85 nm TiO<sub>2</sub> layer, which, in turn, is coated with a layer of Fe, Co, and Cr oxides having a thickness of 46.5 nm (see paragraph (7) of the Declaration). According to Dr. Gu  neau, Fe, Co, and Cr oxides are well-known to be poisons for photocatalysts. Therefore, one of ordinary skill in the art would limit the contents of those metal oxides because of their known properties as photocatalyst poisons (see paragraph (8) of the Declaration).

The Examiner asserts that the analysis provided by Dr. Gu  neau is contradicted by the specification of the present application and Kato. This is not the case. That this is so is demonstrated by Carneiro et al., Study of the Deposition Parameters and Fe-Dopant Effect in the Photocatalytic Activity of TiO<sub>2</sub> Films Prepared by dc Reactive Magnetron Sputtering, *Vacuum*, 78, 2005, pp. 37-46, a copy of which was cited on May 22, 2006. Carneiro et al. describe the effect of doping a photocatalytic coating of TiO<sub>2</sub> on a substrate with iron. At a low concentration of iron, the layer has higher photocatalytic activity as compared to the undoped layer. In contrast, a highly-doped layer has strongly decreased photocatalytic

activity. In view of the foregoing, Dr. Guéneau's comments are not inconsistent with the specification of the present application and Kato.

In addition, in Examples 2 and 3, the TiO<sub>2</sub> layer is buried under the Fe-Co-Cr layer. For that reason, one would expect that accumulated organic matter could not be decomposed by the TiO<sub>2</sub> layer because it would never get to that layer. Therefore, such a layer is not photocatalytic as recited in the claims of the present application.

Referring to the Examiner's comments in the last paragraph at page 6 of the Office Action dated July 29, 2008, depositing particles of titanium dioxide particles with "a well formed tin oxide coating" would not produce a coated glass glazing provided on at least a portion of one of its faces with a coating having photocatalytic properties, and comprising titanium oxide at least partly crystallized in anatase form, as claimed. Such a process would, as discussed above, also produce a dust of titanium dioxide on the substrate. Such a product is outside the scope of Claim 25 for the reasons set forth above.

Applicants note that Vandiest fails to disclose or suggest depositing a a coated glass glazing provided on at least a portion of one of its faces with a coating having photocatalytic properties, and comprising titanium oxide at least partly crystallized in anatase form

Referring to the Examiner's comments at the first full paragraph at page 13 of the Office Action dated November 14, 2006, the Declarations discussed above address both embodiments described in Vandiest. The two Declarations submitted by Dr. Nghiê address the embodiment where the TiO<sub>2</sub> layer is on the surface, i.e., the non-absorbent layer is on the absorbent layer. The Declaration from Dr. Guéneau addresses the embodiment in which the TiO<sub>2</sub> layer is on the bottom, i.e., the absorbent layer is on the non-absorbent layer.

In view of the foregoing, Vandiest fails to describe or suggest the claimed coated substrate. Accordingly, withdrawal of these grounds of rejection is respectfully requested.

The rejection under 35 U.S.C. §103(a) over Plumat et al. (U.S. patent No. 3,984,591) in view of Vandiest or Kato is respectfully traversed. The cited references fail to suggest the claimed coated substrate.

Plumat et al. describe a process for forming a metallic oxide coating on a substrate. See the Abstract. As recognized by the Examiner, Plumat et al. fail to disclose a coating of titanium oxide in the anatase form that is photocatalytic. See, for example, page 9 of the Office Action dated February 21, 2006.

Dr. Guéneau notes that Kato is completely silent regarding the size of titanium oxide crystallites (see paragraph (15) of the Declaration). According to Dr. Guéneau, Kato also fails to suggest that the titanium crystallites have an average size of between 60 and 100 nm, since the reference fails to even mention titanium crystallites at all. See paragraph (18) of the Declaration.

As discussed above, Vandiest fails to suggest the claimed coated substrate. Accordingly, the combination of Plumat et al. with either Vandiest or Kato fails to suggest the claimed substrate. Withdrawal of this ground of rejection is respectfully requested.

The rejection of the claims under 35 U.S.C. §112, first paragraph, is believed to be obviated by the amendment submitted above. The feature of the claim precipitating the rejection has been removed from the claim. Accordingly, withdrawal of this ground of rejection is respectfully requested.

Application No. 09/923,353  
Reply to Office Action of July 29, 2008

Applicants submit that the present application is in condition for allowance. Early notice to this effect is earnestly solicited.

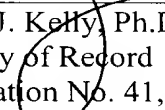
Respectfully submitted,

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